

6.6 Practice A

In Exercises 1–6, solve the equation.

1. $6^{x-7} = 6^{2x+3}$

2. $e^{5x} = e^{3x+4}$

3. $3^{x+1} = 9^{x-3}$

4. $2^x = 5$

5. $8^x = 35$

6. $16^{3x-2} = \left(\frac{1}{4}\right)^{5-x}$

7. The length ℓ (in centimeters) of a scalloped hammerhead shark can be modeled by the function $\ell = 266 - 219e^{-0.05t}$, where t is the age (in years) of the shark.

a. How old is a shark that is 200 centimeters long?

b. How long is a shark that is twice as old as the shark in part (a)?

In Exercises 8–13, solve the equation.

8. $\ln(3x - 8) = \ln(x + 6)$

9. $\log_3(9x - 2) = \log_3(4x + 3)$

10. $\log(4x + 1) = \log 25$

11. $\log_6(5x + 4) = 2$

12. $\log(10x - 7) = 3$

13. $\log_3(4x + 2) = \log_3 6x$

In Exercises 14–17, solve the equation. Check for extraneous solutions.

14. $\log_2 x + \log_2(x - 3) = 2$

15. $\log_3 3x + \log_3(2x + 1) = 2$

16. $\ln x + \ln(x + 4) = 3$

17. $\log_6 2x^2 + \log_6 3 = 2$

18. You deposit \$400 in an account that pays 5% annual interest. How long will it take for the balance to double for each frequency of compounding?

a. annually

b. quarterly

c. daily

d. continuously

In Exercises 19–21, solve the inequality.

19. $7^x < 42$

20. $3^x \geq 24$

21. $\log_3 x > 2$

In Exercises 22 and 23, use a graphing calculator to solve the equation.

22. $\ln 3x = 4^{-x+5}$

23. $\log x = 9^{-2x}$

6.6 Practice B

In Exercises 1–6, solve the equation.

1. $9^{3x-5} = 81^{3x+2}$

2. $7^x = 32$

3. $9^{3x+6} = \left(\frac{1}{3}\right)^{8-x}$

4. $6^{4x} = 13$

5. $2e^{3x} + 6 = 10$

6. $4e^{2x} - 7 = 1$

7. Fifty grams of radium are stored in a container. The amount R (in grams) of radium present after t years can be modeled by $R = 50e^{-0.00043t}$.

- a. After how many years will only 20 grams of radium be present?
- b. Seventy-five grams of radium are stored in a different container. The amount R (in grams) of radium present after t years can be modeled by $R = 75e^{-0.00043t}$. Will it take *more years* or *fewer years* for only 20 grams of the radium in this container to be present, compared to the answer in part (a)? Explain.

In Exercises 8–13, solve the equation.

8. $\ln(5x - 2) = \ln(x + 6)$

9. $\log(3x + 5) = \log 6$

10. $\log_2(3x + 12) = 4$

11. $\log_3(3x + 7) = \log_3(10x)$

12. $\log_2(x^2 - 2x + 1) = 4$

13. $\log_3(x^2 + x + 7) = 3$

In Exercises 14–17, solve the equation. Check for extraneous solutions.

14. $\ln x + \ln(x - 2) = 5$

15. $\log_5 2x^2 + \log_5 8 = 2$

16. $\log_3(-x) + \log_3(x + 8) = 2$

17. $\log_2(x + 2) + \log_2(x + 5) = 4$

In Exercises 18–20, solve the inequality.

18. $e^{x-2} < 8$

19. $\ln x > 5$

20. $-2 \log_3 x + 2 \leq 10$

21. You deposit \$2000 in Account A, which pays 2.25% annual interest compounded monthly. You deposit another \$2000 in Account B, which pays 3% annual interest compounded monthly. When is the sum of the balance in both accounts at least \$5000?